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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/791,421 | 03/02/2004 | Dilip M. Shah | 67,097-025; EH-10985 | 3769 |

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| EXAMINER | |
|---|---|
| VERDIER, CHRISTOPHER M | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 3745 | |

DATE MAILED: 08/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/791,421 | SHAH ET AL. | |
| | Examiner | Art Unit | |
| | Christopher Verdier | 3745 | |

*-- The MAILING DATE of this c mmunicati n appears n the cover sheet with the c rrespondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *19 May 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-29* is/are pending in the application.

4a) Of the above claim(s) *3,6-10,14 and 17-21* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4,5,11-13,15,16 and 22-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *02 March 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *3-2-04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

***Election/Restrictions***

Applicant's election without traverse of species 2 in the reply filed on May 19, 2006 is acknowledged.

Claims 3, 6-10, 14, and 17- 21 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on May 19, 2006.

Receipt and entry of Applicant's Preliminary Amendments dated March 15, 2004 and May 20, 2004, and May 24, 2005 are acknowledged.

***Drawings***

Figure 4 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Specification***

The disclosure is objected to because of the following informalities: Appropriate correction is required.

On page 1, the second line of the title should not be underlined.

In paragraph 2, line 3, -- of -- should be inserted before "kilohertz".

In paragraph 27, line 5, "<110>" should be changed to -- <112> --.

The specification is objected to under 37 CFR 1.52(b)(6), because the paragraph numbers included in the brackets (e.g. [1]) do not consist of at least four numerals enclosed in square brackets, including leading zeros (e.g., [0001]).

The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required:

Claim 12, line 3, which recites that the compressor is in at least partial fluid communication with the fan, has no antecedent basis in the specification.

Claim 12, lines 5-6, which recite the rotor having at least one high modulus blade, has no antecedent basis for the underlined limitation in the specification.

### *Claim Objections*

Claims 22 and 27 are objected to because of the following informalities: Appropriate correction is required.

In claim 22, line 1, "turbine blade" should be changed to -- aircraft engine --.

In claim 27, line 1, "turbine blade" should be changed to -- aircraft engine --.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-2, 4, 11, and 23-25 are rejected under 35 U.S.C. 102(b) as being anticipated by Kington 5,292,385. Note the high modulus turbine blade 26 comprising a base portion and a tip portion, a primary direction near 30 that extends from the base portion to the tip portion, and the turbine blade being formed of a base metal that has a crystallographic orientation <010>, the crystallographic orientation having a high modulus direction, wherein the high modulus direction is aligned with the primary direction. The high modulus direction is aligned to within a cone of about ten degrees of the primary direction. The base metal is a Ni base alloy. Also disclosed is a method of tuning the natural vibration frequency of the turbine blade, comprising the step of increasing the elastic modulus in the primary direction of the turbine blade, with the primary

direction being a direction that extends from the base to the tip. Concerning claim 11, which recites that the turbine blade has been heat treated to recrystallize the base metal with the primary direction, this is a product-by-process claim. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product-by-process claim does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

Claims 1-2, 4-5, 11, 23-26, and 28-29 are rejected under 35 U.S.C. 102(b) as being anticipated by Shah 4,915,907 (column 5, lines 32-34 and column 6, lines 1-3). Note the high modulus turbine blade comprising a base portion and a tip portion, a primary direction which is the airfoil longitudinal axis that extends from the base portion to the tip portion, and the turbine blade being formed of a base metal that has a crystallographic orientation <111>, the crystallographic orientation having a high modulus direction, wherein the high modulus direction is aligned with the primary direction. The high modulus direction is aligned to within a cone of about ten degrees of the primary direction. The base metal is a Ni base alloy. Note the alloy composition(s) in column 3, lines 5-10, and tables I-II, which fall within the claimed ranges recited in claim 5. Also disclosed is a method of tuning the natural vibration frequency of the turbine blade, comprising the step of increasing the elastic modulus in the primary direction of the turbine blade, with the primary direction being a direction that extends from the base to the tip. The structure is a cubic crystallographic structure with an associated <111> crystallographic

direction, with the <111> crystallographic direction being aligned within a cone of about ten degrees of the primary direction. Concerning claim 11, which recites that the turbine blade has been heat treated to recrystallize the base metal with the primary direction, this is a product-by-process claim. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product-by-process claim does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 12-13, 15, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kington 5,292,385 in view of Howald 3,572,733. Kington discloses an aircraft engine substantially as claimed, comprising a compressor, a combustor in fluid communication with the compressor, and a turbine in fluid communication with the combustor (column 1, lines 6-16). A high modulus turbine blade 26 is provided, comprising a base portion and a tip portion, a primary direction near 30 that extends from the base portion to the tip portion, and the turbine blade being formed of a base metal that has a crystallographic orientation <010>, the crystallographic orientation having a high modulus direction, wherein the high modulus direction is aligned with the primary direction. The high modulus direction is aligned to within a cone of about ten degrees of the primary direction. The base metal is a Ni base alloy. Concerning claim 22, which recites that the turbine blade has been heat treated to recrystallize the base metal with the primary direction, this is a product-by-process claim. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product-by-process claim does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

However, Kington does not disclose that the aircraft engine comprises a fan with the compressor at least in partial fluid communication with the fan.

Howald shows an aircraft engine, having a fan 20 and a compressor 24, with the compressor at least in partial fluid communication with the fan, a combustor 26 in fluid communication with the compressor, and a turbine 16 in fluid communication with the combustor, for the purpose of pressurizing an air stream for sucking into the engine.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide the aircraft engine of Kington with a fan with the compressor at least in partial fluid communication with the fan, as taught by Howald, for the purpose of pressurizing an air stream for sucking into the engine.

Claims 12-13, 15-16, 22, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shah 4,915,907 in view of Howald 3,572,733. Shah discloses a gas turbine engine substantially as claimed, including a high modulus turbine blade comprising a base portion and a tip portion, a primary direction which is the airfoil longitudinal axis that extends from the base portion to the tip portion, and the turbine blade being formed of a base metal that has a crystallographic orientation <111>, the crystallographic orientation having a high modulus direction, wherein the high modulus direction is aligned with the primary direction. The high modulus direction is aligned to within a cone of about ten degrees of the primary direction. The base metal is a Ni base alloy. Note the alloy composition(s) in column 3, lines 5-10, and tables I-

II, which fall within the claimed ranges recited in claim 5. Concerning claim 22, which recites that the turbine blade has been heat treated to recrystallize the base metal with the primary direction, this is a product-by-process claim. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product-by-process claim does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

However, Shah does not disclose that the gas turbine engine comprises a fan and a compressor, with the compressor at least in partial fluid communication with the fan, and a combustor in fluid communication with the compressor, with a turbine in fluid communication with the combustor.

Howald shows an aircraft engine, having a fan 20 and a compressor 24, with the compressor at least in partial fluid communication with the fan, a combustor 26 in fluid communication with the compressor, and a turbine 16 in fluid communication with the combustor, for the purpose of pressurizing an air stream for sucking into the engine.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the gas turbine engine of Shah such that it includes a fan and a compressor, with the compressor at least in partial fluid communication with the fan, and a

combustor in fluid communication with the compressor, with a turbine in fluid communication with the combustor, as taught by Howald, for the purpose of pressurizing an air stream for sucking into the engine.

***Prior Art***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Chin is cited to show a turbine sheet with a <111> orientation along a primary axis. This reference could also have been applied as it anticipates at least claim 1 under 35 U.S.C. 102, but is not applied at this time in order to avoid multiple rejections.

Japanese Patent 57-199,559 and European Patent 059,549 (which last sheet of drawings is unavailable, but corresponds to Japanese Patent 57-199,559) are cited to show a turbine blade with a <111> orientation along a primary axis. These references could also have been applied as they anticipate at least claim 1 under 35 U.S.C. 102, but are not applied at this time in order to avoid multiple rejections.

European Patents 066,971 and 100,150 are cited to show a turbine blade with a <111> orientation along a primary axis. These references could also have been applied as they anticipate at least claim 1 under 35 U.S.C. 102, but are not applied at this time in order to avoid multiple rejections.

Petrov is cited to show an apparatus for manufacturing articles and turbine blades whereby any primary crystallographic orientation such as <111>, <112> may be obtained. This reference could also have been applied as it anticipates at least claim 1 under 35 U.S.C. 102, but is not applied at this time in order to avoid multiple rejections.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher Verdier whose telephone number is (571) 272-4824. The examiner can normally be reached on Monday-Friday from 10:00-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward K. Look can be reached on (571) 272-4820. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

C.V.
August 2, 2006

Christopher Verdier
Primary Examiner
Art Unit 3745